Washington State Department of Transportation

Memorandum

December 9, 2003

TO: John F. Conrad
MS 47316

FROM: Kevin J. Dayton/Ron Howard
705-7821/705-7823

SUBJECT: CRIPs
Contractors' Cost Reduction Incentive Proposals
Experience During Year Ending 9/30/03

This report has been prepared to cover the twelve-months period from October, 2002 through September, 2003.

Value Engineering in the Construction area has diminished significantly compared to last year. While the number of proposals approved during this period remained steady compared with the previous report, the savings to the State decreased by more than half. We continue to pursue savings in this arena. We are looking at twenty-six additional proposals with a combined value of perhaps $700,000.

The results are as follows:

Period	Approved	Savings to the State	Removed from List
Oct 2002 – Sept, 2003	**16 proposals**	**$307,136**	**5 proposals**

These are the actual savings of the proposals in terms of money. Two of these approved ideas also included reductions in contract time. Reduced durations save administrative costs for both WSDOT and the Contractor and provide a major benefit to the traveling public. All of these proposals also include a transfer of the constructability risk from WSDOT to the Contractor. These risk transfers, together with the evidence of teamwork and partnering that CRIPs represent, provide intangible benefits in addition to the face value of the proposals.

By comparison, CRIP savings in the previous year were $642,746. Looking to the future, we are currently reviewing 26 CRIPs with potential savings of approximately $700,000

A description of the accepted CRIPs and their potential application to future designs is attached. This report includes the first completed proposal from the Narrows Bridge project. We expect the Narrows to produce extensive post-award Value Engineering results in the years to come.

KJD/RH:cd
Attachments (report and spreadsheet)

cc/att: Dan Mathis, FHWA, 40943
Tony Allen, 47365
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Don Nelson, 47324
Harold Peterfeso, 47330
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APPROVED CRIPS – Period Ending 9/30/2003

REVISED PIPE MATERIAL MORE ECONOMICAL
(C-5983, C.O.148)

This structures project in downtown Seattle included piping for fire control systems. The pipe was to be embedded in the concrete bridge railing. The original plans called out ductile iron pipe for this purpose. The Contractor proposed a substitution of high-density polyethylene pipe for the same purpose. The plastic piping is easier to shape and handle, is a less-expensive material and is thought to be an equal product for the purpose. The resulting cost savings was divided between the State and the Contractor, with the State's share amounting to nearly $10,000. For future designs, the evolving HDPE product should be considered wherever possible.

PLANNED RETAINING WALL WAS EXCESSIVE
(C-6145, C.O.24)

This project provides an improved interchange between SR 167 and I-405 in South Renton. One feature of the design was a retaining wall at the steep slope between the new ramp structure's west abutment and the existing SB roadway. When the structure was laid out in the field, it was discovered that the slope was not as steep as expected and that a smaller wall would do the job. The Contractor did the redesign work and the change resulted in savings of nearly $16,000. The State's share amounted to $7,860.79. This change corrected a design error. Had the spatial relationship between the two facilities been accurately defined, the entire savings could have been realized without this proposal.

COLUMN-JACKETING REVISIONS REDUCE TRAFFIC CONTROL
(C-6231, C.O.5)

This project provided seismic retrofit work on a number of bridges on I-5 in South Seattle. The plans were primarily for steel jacketing of columns and pedestals. The Contractor's proposal had two primary subjects. On some of the bridges, the designed jacket caused intrusions into adjacent roadways. Where possible, the jacket configuration was modified to reduce the intrusions and the accompanying traffic control needs. The second primary part of the proposal affected work immediately adjacent to I-5 at Holgate Street and other locations. At these sites, the work required removal of the mainline barrier, temporary barrier during construction and then reconstruction of the permanent barrier. The Contractor proposed a steel form for the permanent barrier that was strong enough to act as a temporary barrier installation. The form was then left in place after the barrier concrete was placed. This sequence not only reduced the cost of temporary barrier, but also a significant amount of traffic control. For future designs, we should consider the affect of various jacket geometry on traffic and try to minimize the overall project cost.

MULTIPLE ACTIVITIES WITH A SINGLE TRAFFIC CONFIGURATION
(C-6276, C.O.10)

This project replaces a bridge over Barclay Creek on the Stevens Pass Highway (SR 2). Included in the original plan was traffic staging that installed barrier during the construction of the north side embankment and, later on, required northside lane closures for matching in the new bridge with the existing highway at both ends of the project. The Contractor proposed constructing the embankment at the same time as the match-in work was to be performed. This eliminated significant traffic control and also decreased the affect on public traffic. The State's share of the resulting savings was $12,367. Since this savings was realized through aggressive planning and management by the Contractor, it is not suggested that the ultimate approach could have or should have been included in the plans.

STEEPENED TEMPORARY SLOPE USES LESS MATERIAL
(C-6317, C.O.7)

A minor feature of this reconstruction of the NE 8th Street Overcrossing of SR 405 in Bellevue was an embankment slope on the south side of the temporary location of the bridge widening section. This slope was designed at a 2:1, which is standard. In this case, in a temporary location and considering the available material, a slope of 1½:1 is adequate. In addition to a modest cost savings (the Owner's share was $1,755,) this change also resolved a conflict with two drainage features at the toe of the slopes. There is no reason to think that design should have planned this slope in this manner. It is so minor that anything except a routine application of a standard geometry would not have been cost-effective.

ALTERNATE DEMOLITION PLAN REDUCES IMPACTS
(C-6317, C.O.17)

After traffic was placed on the temporary bridge configuration discussed above, a partial demolition of the south side of the existing bridge was needed. The plans called for 20 night-time closures of I-405 and a careful, piece-by-piece dismantling. The Contractor proposed an alternate approach. He would close I-405, lay a sand blanket on the pavement and mobilize a lot of equipment to hammer the bridge down onto the blanket. Then he would clean up the rubble, pick up the sand blanket and reopen the freeway—**all with two partial closures during one weekend!** The extra costs of doing the work this way offset the traffic control savings, so there was no cost savings, but the traveling public experienced major benefits. The proposal also included a 20-day reduction in contract duration, providing intangible administrative savings for both the owner and the Contractor. This was a bold move by the Contractor, with extensive risks. We could not have written the plans this way because there were too many things that could have gone wrong. The traveling public should be grateful that this Contractor was on the job.

APPROVED CRIPS – Period Ending 9/30/2003

ALTERNATE BARRIER CONFIGURATION SAVED DOLLARS
(C-6351, C.O.3)

This project was bridge repair of expansion joints on several structures in Southeast Washington. The plans included a temporary barrier installation at each site which provided a protected workspace for the full length of the work area. The Contractor noted that a shorter barrier would be suitable, provided that all equipment was moved off of each bridge at the end of each workshift. The Traffic control savings, offset by the increased mob/demob costs resulted in a cost reduction (State's share of net savings) of $3,200. This approach to the work could have been envisioned during design. A simple provision requiring the demobilization each shift would have accomplished the same outcome except that the costs would have been competitively bid and the State would have realized all of the savings. This should be considered in future designs of this type of work.

RECYCLING ON-SITE MATERIAL YIELDS DIVIDENDS
(C-6396, C.O.4)

In an exercise of inter-agency cooperation, a WSDOT project crew administered this earthquake repair job on Deschutes Parkway in Olympia for the Department of General Administration. The plans called for removal of the native material and the existing pavement and replacement with imported fill and new pavement. The Contractor observed that some on-site material would be useable as fill and that the pavement could be crushed and used as fill also. This was a good stroke of business as the Owner's share of the resulting savings turned out to be $60,615. In addition, the revised work was a lot faster than the plan and the project duration was reduced by 30 working days, restoring the road to public use sooner than anticipated. This is an ideal use of the CRIP concept. Specifying selective re-use of material without an accompanying incentive has been tried repeatedly and has failed. This approach to earthwork takes a cooperative and collaborative contractor/inspector team—the exact environment created by successful CRIPs.

APPROVED CRIPS – Period Ending 9/30/2003

WALL REPLACED WITH SLOPE AND TREE REPLACEMENT
(C-6441, C.O.20)

This is the Tacoma Narrows Bridge project. It is not a conventional design-bid-build, but rather a Design-Build type of contract. As the design is developed the Design-Builder may propose modifications of the defined scope and/or standards which result in a cost or time savings. If and when accepted, these take on all the characteristics of a Cost Reduction Proposal, but are actually post-award Value Engineering scope changes. Hopefully, there will be a lot of these on this project. In this first example, the original scope called for a retaining wall to avoid the removal of a number of existing trees. The Design-Builder proposed an alternative. The wall would not be built and a minimum number of trees would be removed to allow a slope to take its place. The lost trees would be replaced by a fairly extensive revegetation scheme. The State's share of the savings of this proposal amounted to $62,500. The Designers are part of the Design-Builder team on this job. Their assignment is to produce plans and find mutually beneficial opportunities, like this, that will provide the same or a better function and reduce the overall cost of the project.

POLLUTION PROTECTION ELIMINATED BY CAREFUL WORK
(C-6449, C.O.3)

This project is a widening of SR 12 between Pasco and Walla Walla. It includes an embankment adjacent to the river. The plans called for installation of a silt curtain to insure against silts from the work entering the stream. The Contractor proposed eliminating the curtain, working with great care to prevent erosion and being prepared at any time to install whatever pollution control mechanisms that might be required by events on the project. With the Contractor committing to this kind of care, the State agreed to delete the curtain. The savings were split, with the State's share amounting to $15,750. The design was appropriate. Until a contractor is willing to take this kind of responsibility in exchange for an incentive payment, the only prudent course is to provide extensive protective controls.

PAINTING OVER LANE LINES ELIMINATED REMOVAL COSTS
(C-6473, C.O.29)

This project to improve I-5 through Bellingham contained extensive temporary traffic configurations. These were to be accomplished by removing the existing paint stripe and using temporary raised pavement markers to delineate the revised configuration. The paint stripe was to be put back in its original location after completion of the work. The Contractor proposed painting over the existing with gray paint rather than removing it. This proposal resulted in savings of $12,600, half of which the State kept. This approach is not recommended for widespread use. Generally, this method will create a visible line where the old stripe was and will result in confusion for drivers. In this particular situation, the approach was successful.

APPROVED CRIPS – Period Ending 9/30/2003

WORKING IN TIGHT SPACES ELIMINATES GUARDRAIL REMOVAL
(C-6478, C.O.1)

This project rehabilitates a bridge deck on SR 2 near Davenport. The working width of the existing bridge was tight, so the design called for removal and reinstallation of the thrie-beam guardrail on the structure. The Contractor developed a screed system that could be utilized in the restricted space without removing the rail. The resulting modest savings was split, with the State's share at $1,101. While this scheme was effective with the willing cooperation of the contractor, our designs should continue to include accommodations for constructability to ensure the widest range of bidders and the most competitive price.

COMMON BORROW IN SELECTED AREAS REDUCES COST
(C-6483, C.O.11)

This transit-access enhancement project north of Lynnwood on I-5 contained extensive wall backfill using the expensive item of Gravel Backfill for Walls. In many zones of this backfill, a lower quality material would be entirely suitable. The Contractor proposed substituting a common backfill material in these zones as a shared cost savings. The project office developed an innovative measurement agreement which utilized a unit price measure of the savings with a guaranteed minimum savings to the owner of $28,125. The savings from this proposal actually go to Sound Transit, who is financing the project. As stated above, use of selective earthwork quantities with different material is difficult to enforce and is not recommended for use by designers. Far better to allow the Contractor to propose, simplifying enforcement.

EARTH WALL DESIGN CHEAPER THAN CAST-IN-PLACE
(C-6494, C.O.7)

The Bothell-Everett highway (SR 527) is being widened through the City of Mill Creek on this project. The major items of work include the construction of 7-retaining walls. During the design phase, the city of Mill Creek requested that all walls visible to the abutting residents or traveling public be cast-in-place for aesthetic reasons. The design office decided to use this wall type at all 7-locations to attain economy of scale. However, the physical site would allow the use of manufactured earth walls. The Contractor proposed this substitution, at a cost savings to WSDOT, for 4-wall locations that would not be seen by the nearby residents or traveling public. The city and State agreed to the change. The State's share of the cost savings amounted to $47,404. The design decision about economy of scale was incorrect.

APPROVED CRIPS – Period Ending 9/30/2003

LESS-EXPENSIVE EQUIPMENT ACCOMPLISHED SAME RESULT
(C-6531, C.O.1)

This bridge rehab project on I-82 near Ellensburg contained provisions for deck scarification by diamond grinding and also contained a finished grind texture specification. The Contractor proposed use of a "Micro-milling" machine in lieu of the diamond grinder. Test sections proved that the milling machine could accomplish the specified results, so the substitution was allowed. The resulting cost savings were split between the Contractor and the State, with the State's share amounting to $2,684. The Bridge design office should consider allowing the use of the Micro-Mill on future jobs where diamond-grind results are desired.

ALTERNATE DRILLING METHOD REDUCES COST
(C-6609, C.O.3)

This project replaces a bridge over Nolan Creek on Highway 101 south of Forks. The design included drilled shaft foundations with temporary casing specified. The Contractor offered to eliminate the casing by using a slurry method. The State's share of the savings turned out to be $26,250, but the significant benefit of the agreement was the transfer of constructability risk to the Contractor. For future designs, any place there is any risk of caving during drilling, we should continue to follow the conservative design of casings. If a future contractor, in exchange for half of the cost savings, is willing to take on the risk of constructing shafts without casings, we should enthusiastically embrace the proposal.

REMOVED FROM LIST – Period Ending 9/30/2003

CONTRACTOR WITHDREW SIGNAL POLE DELETION

On a paving project with minor intersection work, a discussion took place concerning a signal pole that was to be removed and replaced. It appeared that the existing pole could be left in place. The Contractor chose not to pursue the idea. The State office followed through and initiated a change order. The State retained all of the risk of the proposal and kept 100% of the savings.

BARRIER SUBSTITUTION NOT ACCEPTABLE

On an Interstate interchange reconstruction project, the Contractor proposed a substitution of pre-cast barrier for cast-in-place. It was felt that the proposal would not provide an equal product, neither performance-wise nor esthetically. The Contractor's proposal was not accepted.

COLUMN JACKETING SUBSTITUTION NOT ACCEPTABLE

On a seismic retrofit project involving four bridges, the plans called for steel jacketing of the columns. The Contractor proposed a substitution of a carbon fiber wrap to encase the columns. The proposal was found to be structurally inadequate and was rejected.

WALL REVISION PROPOSALS NOT PURSUED

On an interchange project, the Contractor submitted two proposals for revisions to wall designs. The State requested additional design information and the Contractor chose not to pursue the proposals.